

The Future for Drinking Water Contaminant Regulations



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Regulations versus Health

- ✦ Not every drinking water contaminant of health consequence gets regulated
- ✦ Not every regulated contaminant has health consequence



The Safe Drinking Water Act

- ✦ Federal law to protect public from drinking water contaminants of health concern
- ✦ Adopted 1974
- ✦ Significant amendments in 1986, 1996
- ✦ 1986 amendments had explicit health goals and risk management approaches

The Safe Drinking Water Act Directs EPA's DW Regulations

✦ Maximum Contaminant Level Goals

- Not enforceable, but direct MCL selection
- "Each MCLG...shall be set at the level at which no known or anticipated adverse effects on the health of persons occur and which allow an adequate margin of safety"

✦ National Primary Drinking Water Regulations

- Enforceable
- Set as close as feasible to MCLGs
- Feasible analytical methods, treatment technologies
- Administrator can adjust MCL for cost reasons

✦ Other regulatory applications generally not considered

How a Drinking Water Regulation is Put Together

- ✦ A contaminant is identified as being of possible health concern in drinking water
- ✦ The contaminant is listed on the EPA DW **Contaminant Candidate List**
- ✦ Health, occurrence and exposure information are collected for preliminary risk assessment
- ✦ A determination is then made on whether there exists an opportunity to reduce public health risks by regulation

How a Drinking Water Regulation is Put Together, 2

- ✦ After a determination to go forward is made, the regulatory elements are developed
 - Risk assessments to determine potential standards and to quantify benefits
 - Analytical methods for the levels of concern
 - Treatment methods to achieve compliance
 - Cost analyses for compliance and enforcement
- ✦ MCLG and feasible MCLs are suggested

How a Drinking Water Regulation is Put Together, 3

- ✦ Draft MCL is selected based on benefits/costs
- ✦ Draft MCL and other regulatory elements are reviewed by EPA and OMB, then proposed
- ✦ Public comments are taken and addressed
- ✦ Final NPDWR is reviewed by EPA and OMB again, then promulgated
- ✦ Implementation and enforcement follow according to schedule

What the Near-Term Future Holds

- ◆ USEPA regulations in development
 - TCR revisions/ Distribution system regs
- ◆ Security concerns
- ◆ Data gathering for future regulations
 - CCL2, CCL3
 - UCMR2



TCR & Distribution System

- ✦ TCR review to consider monitoring, not MCLs
- ✦ Distribution system reg suggested by FACA2
 - Will consider cross-connection control, other O&M elements
 - Discussion papers on EPA's website
 - ✦ www.epa.gov/safewater/tcr
 - Workgroup now up and running
- ✦ Regulations years away

Security Issues

- ✦ Bioterrorism monitoring?
 - R&D effort to support large system source and finished water monitoring for bioterrorism agents
- ✦ For all systems, a change in emphasis from terrorism to natural disasters
 - Emergency response preparation
 - Delivery of potable water
- ✦ Unknown if regulations will address these

Contaminant Candidate Lists

- ✦ CCL to be published every five years
 - List unregulated contaminants known or anticipated to occur in public water supplies that may require regulation
- ✦ CCL criteria
 - Consider adverse health effects
 - Consider known or anticipated occurrence
 - Consult with scientific community




Previous Approach

- ✦ CCL1 based on best professional judgements
 - Chemicals
 - Microbials
- ✦ CCL1 regulatory determinations addressed 9 of 60 on list
- ✦ CCL2 is 51 left-overs from CCL1

CCL2 Microbials

- ◆ Adenoviruses
- ◆ Caliciviruses
- ◆ Coxsackieviruses
- ◆ Echoviruses
- ◆ Cyanobacteria (blue-green algae), other freshwater algae, and their toxins
- ◆ *Helicobacter pylori*
- ◆ Microsporidia (Enterocytozoon and Septata)
- ◆ Mycobacterium avium intracellulare (MAC)

CCL2 Chemicals


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- 1,1,1,2-tetrachloroethane
 - 1,1-dichloroethane
 - 1,2-diphenylhydrazine
 - 1,3-dichloropropene
 - 2,2-dichloropropane
 - 2,4-dinitrophenol
 - 2,6-dinitrotoluene
 - Acetochlor
 - Aluminum
 - Bromobenzene
 - DCPA di-acid degradate
 - Diazinon
 - Diuron
 - Fonofos
 - Linuron
 - Methyl-t-butyl ether (MTBE)
 - Molinate
 - Organotins
 - Prometon
 - Terbacil
 - Triazines and degradation products of triazines
 - Alachlor ESA and acetanilide degradation products
 - 1,2,4-trimethylbenzene
 - 1,1-dichloropropene
 - 1,3-dichloropropane
 - 2,4,6-trichlorophenol
 - 2,4-dichlorophenol
 - 2,4-dinitrotoluene
 - 2-methylphenol (o-cresol)
 - Vanadium
 - Boron
 - DCPA mono-acid degradate
 - DDE
 - Disulfoton
 - EPTC (s-ethyl-dipropylthiocarbamate)
 - p-Isopropyltoluene (p-cymene)
 - Methyl bromide
 - Metolachlor
 - Nitrobenzene
 - Perchlorate
 - RDX
 - Terbufos

CCL2 Regulatory Determinations

✦ EPA reviewed 13 contaminants on CCL2 for possible regulation

✦ Perchlorate, MTBE

✦ 11 others

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- Boron
 - Dacthal mono and diacid degradates
 - DDE
 - 1,3 Dichloropropene
 - 2,4 Dinitrotoluene
 - EPTC
 - 2,6 Dinitrotoluene
 - Fonofos
 - Terbacil
 - 1,1,2,2-Tetrachloroethane

Contaminant Candidate List 3

- ✦ USEPA asked National Academy of Sciences for advice
 - Suggested top-down approach
 - Consider universe of chemicals, microbials
 - Screen to possible contaminants
 - Further winnow to draft CCL
- ✦ Proposed models, QSAR
- ✦ Very theoretical

More About CCL3

- ◆ National Drinking Water Advisory Council reviewed NAS approach
 - Determined that methods, resources currently lacking
 - Suggested alternative approach incorporating best professional judgement
- ◆ USEPA asked for nominations
 - FR 71 #119, October 16, 2006, pp60704-60708
- ◆ Draft CCL3 slated for late 2007
- ◆ Final CCL3 slated for late 2008

Unregulated Contaminant Monitoring Rule, 2

- ◆ USEPA is finalizing a second Unregulated Contaminant Monitoring Rule
 - Expected early 2007
- ◆ Monitoring during 2008-2010
- ◆ USEPA will again manage data
- ◆ Based on lessons learned, should be more user friendly...

Proposed UCMR Chemicals

- ✦ Acetochlor, Acetochlor ESA and OA
- ✦ Alachlor, Alachlor ESA and OA
- ✦ Metolachlor, Metolachlor ESA and OA
- ✦ Nitrosamines
 - NDMA, NDBA, NDEA, NDPA, NMEA, NPyr
- ✦ Dimethoate
- ✦ Terbufos sulfone
- ✦ BDE-47, BDE-99, BDE-100, BDE-153, 245-HBB
- ✦ 1,3-dinitrobenzene, TNT, RDX

Worries About What's Over the Horizon

- ◆ Human-derived, environmentally-persistent contaminants of possible health concern (HDEPCPHC)
- ◆ Disinfection byproducts
- ◆ Algal toxins



HDEPCPHC

- ◆ Pharmaceutically-active compounds
 - Prescription drugs
 - Over the counter medications
 - Veterinary antibiotics and hormones
- ◆ Personal care products
- ◆ Endocrine disrupting chemicals
 - Estrogens and androgens
- ◆ Pesticides

HDEPCPHC Health Worries

- ◆ Feminization of males
- ◆ Hormone-influenced health effects
 - Diabetes
 - Early onset of puberty
- ◆ Reproductive and developmental effects
- ◆ Antibiotic resistance
- ◆ Consumer fears about water safety

What Do We Know About Health Effects of These Materials?

- ✦ At environmental levels, very little
- ✦ Some information suggesting pathogen resistance from veterinary use of antibiotics
- ✦ Some information indicating effects on aquatic organisms from sex steroids
- ✦ Algal toxins may cause systemic damage

Current Status

- ✦ Inadequacy of health, occurrence and exposure information prevents regulatory efforts
- ✦ Few on CCL2 list
- ✦ Few on UCMR2 list
- ✦ No USEPA regulatory efforts pending

Disinfection Byproducts

- ✦ The more we look, the more we find
 - N-nitroso compounds
- ✦ Alternative disinfectants make alternative DBPs
 - Chloramines → iodoacetate
- ✦ Halo-nitro-compounds may be more toxic
- ✦ We may be regulating the wrong things

Algae

- ✦ Some cyanobacteria (blue-green algae) produce toxins
- ✦ Many algae are a pain to treat, regardless of toxicity
 - Taste and odor problems from disinfection, decay
 - Filter overloads
 - pH fluctuations
- ✦ Much unknown about physiology, occurrence, impacts, toxicity

Summary

Concerns for the Here and Now

- ◆ Nutrients → algal growth
- ◆ Disinfection of nitrogenous organic carbon → DBPs
- ◆ Disinfection of seawater-contaminated sources → DBPs

